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ABSTRACT

Few studies in the economics literature have linked individuals' criminal behavior to changes in their personal circumstances. Life shocks, such as natural or personal disasters, could reduce or sever a person's connections to his/her family, job, or community. With fewer connections, crime may become a more attractive option. This study addresses the question of whether an exogenous shock in life circumstances affects criminal activity. Specifically, we estimate the effects of the birth of a child with a random and serious health problem (versus the birth of a healthy infant) on the likelihood that the child's father becomes or remains involved in illegal activities. Controlling for the father's pre-birth criminal activity, we find that the shock of having a child with a serious health problem increases both the father's post-birth conviction and incarceration by 1 to 8 percentage points, depending on the measure of infant health used.

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Expenditures for police, the criminal judicial system, and corrections exceeded $185 billion in the United States in 2003, and crime resulted in a total loss to victims of almost $16 billion in 2004 (Sedgwick 2006). Given these magnitudes, there is much interest in understanding the causes of crime. Theoretical and empirical work in the economics literature to date has focused on the effects of three sets of factors—criminal justice sanctions, human capital, and labor market conditions. It is important to understand the contributions of these factors because they all can be influenced by public policy. Very little is known, however, about the effects of exogenous shocks in individual's life circumstances on their propensity to commit crime.

Recent economic research has considered the role of community and family ties, sometimes referred to as "social capital," as a positive force in promoting individuals to engage in pro-social behavior, such as being law-abiding citizens who contribute to the community. Conversely, individuals with low levels of social capital would be more likely to engage in negative social behaviors, such as committing crimes. Akerlof (1998) and others have discussed the difficulty of establishing causal relationships between family or social ties and crime, as it is not plausible to assume that ties such as marriage and parenthood are exogenous.

We consider an individual-level catastrophic event that is random yet has been found to impact the social ties of men. Catastrophic events are not rare occurrences. For example, population estimates indicate that at least one in five individuals is exposed to one or more natural disasters in their lifetime (Briere and Elliott 2000). Catastrophic illness and sudden death are also not uncommon. Catastrophic events could change an individual's propensity to commit crimes through two channels. First, a large scale event such as a natural disaster could reduce both legal labor market returns and expected criminal justice sanctions—factors that have been

studied in the crime literature. Second, the catastrophic event could also change the individual's propensity to commit crime by altering the person's utility function directly—for example, by changing the value the individual places on obeying the law or on taking risks. The latter, which has been much less explored in the literature, would be consistent with a social capital framework in which an exogenous event could reduce an individual's social ties and thus increase that person's criminal behavior.

In this paper, we break new ground by isolating the effects of an exogenous shock in an individual's life circumstances on that individual's propensity to commit crime. Specifically, we estimate the effects of the birth of a child with a severe health problem on the likelihood that the infant's father becomes or remains involved in illegal activities. The shocks that we consider are infant health conditions that are considered by the medical community to be random events with poor long-term prognoses. The analyses contribute to the social capital literature by identifying an exogenous proxy for family ties that may affect social behavior, and the results may have implications for other types of shocks in life circumstances.

Background

Since pioneering work by Becker (1968) and Ehrlich (1973), many economists have investigated individuals' decisions to engage in criminal behavior. Most economic models treat the decision to engage in criminal activity as a labor market choice, in which individuals weigh the expected costs against the expected benefits. The economic literature on the determinants of crime has focused on three sets of factors—criminal justice sanctions, human capital characteristics (such as education), and labor market conditions. Key challenges in estimating the effects of criminal justice sanctions on crime have been to account for the potential endogeneity of sanctions and to disentangle the potential simultaneity between criminal justice policy and

crime. The key challenge in estimating the effects of human capital characteristics on crime is that it is empirically difficult to control for unobserved characteristics of individuals that might affect both their human capital and their propensity to commit crime. Studies of the effects of macro-level factors, such as labor market conditions, can be informative, but those conditions may not reflect the labor market opportunities that are relevant for a specific individual. It is noteworthy that the body of studies that relates macro-level economic data to individuals' criminal behavior has found inconsistent effects of labor market conditions on crime (recent examples include Grogger 1998; Raphael and Winter-Ebmer 2001; Gould, Weinberg and Mustard 2002; and Mocan and Rees 2005).

Several recent studies have used creative approaches to address some of the methodological challenges in studying the causes of crime. Levitt (1997) employed a "natural experiment" approach in which electoral cycles were used to identify changes in police hiring that are independent of the crime rate. He found much stronger effects on crime than when using the actual size of the police force. Corman and Mocan (2000, 2005) used high-frequency time series data to estimate the effect of the size of the police force on crime. By limiting the time horizon to fewer months than would be possible for crime rates to affect the hiring and training of police, they substantially reduced the potential for reverse causality. In both studies, they found that larger police forces reduce crime. Lochner and Moretti (2004) used variations in compulsory schooling legislation to examine the effects of education on crime and found that greater levels of schooling, identified by variations in compulsory schooling laws, result in lower rates of crime. Finally, Jacob and Lefgren (2003) estimated the effects of days off from school (in-service days) on property crime committed by juveniles. They found that an additional day

off from school (a measure of increased opportunity to commit crime) increases juvenile property crime by 14 percent.

Studies in the criminology/sociology literature have added to our understanding of individuals' criminal behavior. First, an extensive literature on criminal careers indicates that males generally begin their criminal careers in late childhood or adolescence and then peak or plateau in their early twenties. Between the ages of 25 and 35, many offenders either decrease their level of activity or desist altogether (see Kerner 2005 for an excellent review of literature on the life cycle of criminal activity). Second, sociological theory posits that individuals with strong ties to their families or work are less likely than those with weaker ties to commit crimes, and that a life transition, such as a marriage or divorce, may change an individual's criminality by altering his or her ties. Studies testing these theories have found support for this argument (e.g., Horney, Osgood and Marshall 1995; Laub, Nagin and Sampson 1998; Laub and Sampson 1993; Sampson and Laub 1990), although it is always possible that unobserved characteristics of individuals make them both more likely to have negative life experiences and more likely to commit crime.

Finally, a new strand of economic research has focused on social capital. According to this literature (e.g., Glaeser, Laibson, and Sacerdote 2002), individuals' community involvement creates positive externalities that enhance the economic growth of their communities. Akerlof (1998) and Folland (2005) found that marriage and fatherhood appear to counter social ills such as crime and low levels of education (Akerlof) and risky behavior (Folland), although both acknowledged the difficulties in inferring causality despite strong associations between family ties and social behavior.

As far as we know, no study has estimated the effects of life circumstances on individuals' criminal behavior while also addressing the potential endogeneity of those circumstances. In this study, we take a first step in filling this gap by incorporating the relatively recent notion of a "natural experiment" to estimate the effects of a random negative life shock on individuals' propensity to commit crime.

Data

We use data from a national longitudinal birth cohort survey that have been linked to medical records of mother respondents and their newborns. The Fragile Families and Child Wellbeing (FFCWB) survey follows a cohort of parents and their newborn children in 20 large U.S. cities (in 15 states). The study was designed to provide information about the conditions and capabilities of new (mostly unwed) parents; the nature, determinants, and trajectories of their relationships; and the long-term consequences for parents and children of welfare reform and other policies.

The FFCWB study randomly sampled births in 75 hospitals between 1998 and 2000. By design, approximately three quarters of the interviewed mothers were unmarried. Face-to-face interviews were conducted with 4,898 mothers while they were still in the hospital after giving birth. The infants' fathers were also interviewed shortly thereafter in the hospital or at another location.[1] Baseline response rates were 86 percent among eligible mothers and 78 percent among eligible fathers (fathers were eligible if the infant's mother completed an interview). Additional data have been collected from the hospital medical records (from the birth) for a sub-sample of

[1] See Reichman et al. (2001) for a description of the research design.

3,517 births in 19 cities (in 15 states).[2] Measures of census tract-level poverty were constructed using the parents' baseline addresses, whether they lived together or apart.

Follow-up interviews were conducted over the telephone with mothers when the child was one and three years old. Eighty nine percent of the mothers who completed baseline interviews were re-interviewed when their children were between 12 and 18 months old; 86 percent of mothers who completed baseline interviews were re-interviewed when their children were about 3 years (between 30 and 50 months) old. Of the 3,830 fathers who completed baseline interviews, 82 percent completed one year follow-up interviews. Of the 3,830 fathers, 77 percent completed three year follow-up interviews.[3]

The enhanced Fragile Families data are well suited for analyzing the effects of an infant health shock on the father's criminal activity. They were collected as part of a longitudinal birth cohort study and include: (1) detailed data on the child's health from birth; (2) information about the father's criminal history; (3) measures of human capital (e.g., both parents' educational attainment); (4) data on a group of men who are in the age range in which changes in criminal activity are most likely to take place; (5) data on the fathers regardless of whether they ever lived with their child; and (6) detailed information on the parents' relationship status, living arrangements, and other children (together and with other partners) at the time of the birth.

Model

According to the framework pioneered by Becker (1968) and Ehrlich (1973), an individual will commit a crime if the expected benefits outweigh the expected costs—a classic utility maximization decision. The expected costs of committing a crime are negatively related to

[2] The medical record data collection is ongoing. Access to the hospital medical records reflects administrative decisions of the different hospitals rather than decisions on the part of individual respondents to have their records reviewed.

[3] Some of the fathers (e.g., those who were incarcerated at the time) completed the follow-up interviews in-person.

the probability of arrest, the probability of punishment, and the expected penalty if convicted. The benefits depend on the expected returns to crime compared to those from legal employment. As indicated earlier, economic studies of the determinants of criminal behavior have focused on the effects of criminal justice sanctions, human capital, and labor market conditions.

Although the specific models vary across studies, most derive from the basic Becker/Ehrlich framework. Consistent with this framework, we posit a supply of offenses function as:

(1) $O = f(pr, C_p, w_l, w_i, Y_p)$

Here, the number of offenses committed (O) is a function of the probability of detection (pr), the expected cost to the offender of punishment (C_p), the individual's wage in the legal sector (w_l), the individual's wage in the illegal sector (w_i) which includes the disutility from engaging in illegal activities, and the individual's potential real permanent income (Y_p). In our case, we focus on the effects of an adverse event—an infant health shock—that does not affect market opportunities to engage in work activities. That is, we are not considering negative events such as a downturn in the business cycle.

An adverse event, such as the illness or death of a loved one, could affect several of the arguments in equation (1). First, it could reduce the value of time spent out of incarceration. This would occur if the expected cost of punishment decreases as a result of the adverse event (i.e., the expected disutility from incarceration decreases). Second, an adverse event could decrease real permanent income, and the income effect could spur greater work effort (legal or illegal). Third, an adverse event that has the potential for increasing eligibility for public support may cause the individual to substitute illegal work for legal work (see, for example, Lemieux, Fortin and Frechette 1994). Fourth, the shock could have a direct impact on the utility function by

changing the individual's subjective valuation of risk or time preference. Fifth, the shock could reduce the individual's ties to the law-abiding community, causing the disutility from engaging in illegal work to decrease and therefore the real wage from illegal work to increase.[4] Thus, adverse events could decrease the cost of punishment to the individual, raise the marginal utility of income through a wealth effect, lead to a substitution of illegal for legal work, and/or make the individual less risk averse or have a higher rate of time preference. In all cases, we would expect the shock in life circumstances to increase the individual's incentive to engage in criminal behavior.

It is also possible that an adverse event increases the value of time spent in household production and thereby reduces both legal and illegal work effort, or that it causes a father to become more risk averse or to have a lower rate of time preference. Under both of these scenarios, criminal activity would decrease. However, we know from previous research that fathers of unhealthy children are less likely than fathers of healthy children to live with the child's mother (Reichman, Corman and Noonan 2004) and therefore less likely to engage in more production in *that* household. We also know that fathers with unhealthy infants work fewer hours in the legal sector than do fathers with healthy infants (Noonan, Reichman and Corman 2005). That is, having a child with a serious health problem appears to decrease the father's social capital in the form of family ties. Thus, although it is theoretically possible that an adverse infant health shock leads to decreased criminal activity, we believe that this scenario is unlikely. Nevertheless, our empirical models allow for this possibility.

Descriptive Analysis

Most serious crimes are committed by men. In a recent Justice Department study, Greenfeld and Snell (1999) found that about 85 percent of violent criminals and convicted felons

[4] The last potential effect would be consistent with the literature on social capital.

are men. For this reason, we focus on the fathers (rather than the mothers) of the children in our sample. In general, we use father reports for information about the father and mother reports for information about the mother. However, in cases where father data are missing, we use mother reports about the father if these are available. We restrict the sample to non-multiple births.

Unless indicated otherwise, all analysis variables are measured at baseline. Fathers were included in the sample whether or not they completed a baseline interview, as long as they completed at least one of the follow-up interviews and medical record data were available for that birth. Mothers provided much of the relevant baseline information (e.g., demographics) for fathers who did not complete the baseline interview. For each of the three survey waves, we include dummy variables indicating that the father did not complete that interview. In general, observations without complete data on all right-hand-side variables were dropped. However, we include a dummy variable for fathers who are missing information on their baseline census tract, whether or not they completed a baseline interview.

Below we describe the measures we use in our analyses, present summary statistics, and point out many salient characteristics of the sample.

Criminal Activity

It is difficult to accurately measure an individual's criminal activity. Administrative records of criminal behavior are rarely linked to individual-level data, so much of what is known about individual-level determinants of criminal behavior comes from surveys. Ideally, individuals would truthfully and accurately recall every crime committed. However, because they may be reluctant to admit to having engaged in serious illegal activities, especially if they have not yet been caught or convicted, individuals' self-reports of criminal activity may be biased. Many surveys ask about the number of contacts with the criminal justice system

(incarcerations or convictions), which may be less biased than self-reports of actual criminal activity. Even these measures likely underreport criminal activity, however, since most crimes do not result in arrest, not all arrests result in convictions, and many convictions do not result in incarceration.[5] For example, according to a recent Justice Department Report (Pasture and Maguire 2003): (1) about half of personal and property offenses are reported to the police, (2) about half (47%) of reported violent crimes and 16 percent of reported property crimes are "cleared" by arrest, (3) about 60 percent of those arrested for a property or violent felony are convicted at any level, and (4) among those who are convicted of a property or violent felony, about 75 percent are incarcerated.

Lochner and Moretti (2004) found that self-reported rates of criminal activity in the National Longitudinal Survey of Youth (NLSY) are low compared to rates of incarceration in the same survey, and that the "underreporting" varies by education and race. In contrast, they found that the NLSY rates of incarceration were largely consistent with rates from the U.S. Census and Uniform Crime Reports. Additionally, they found that using incarceration as a proxy for crime in the NLSY yields associations between education and crime that are very similar to those obtained when using aggregate incarceration data from the Census. These findings suggest that using incarcerations as a proxy for actual crime is a viable strategy by which to reduce the problem of under-reporting of actual crime and that multiple measures of criminal activity can be used to validate and test the sensitivity of findings vis-à-vis determinants of criminal behavior.

Our two main outcome measures are whether the father was ever convicted of a crime between the time that the focal child was born until three years later and whether he was ever incarcerated during the same three year period. For each outcome, we restrict the sample to cases

[5] Individuals can also be arrested and incarcerated before trial and then ultimately acquitted or have the charges dropped. In these cases, measures of incarceration would over-report criminal activity.

with non-missing data on that measure of criminal activity, infant health conditions from the medical records, and covariates (N = 2490 for analyses of conviction and N = 2557 for analyses of incarceration). Descriptive statistics are presented in Table 1 for the two analysis samples.

In the one and three year follow-up surveys, fathers were asked if they had ever been convicted of a serious crime, and when. Overall, 23 percent of the fathers were convicted of a crime either before or after the birth of the focal child (not shown). Although the fathers were convicted for a variety of different types of crimes, the most common were drug crimes (34% of fathers who were ever convicted), property crimes (26%) and violent crimes (22%). From the father's responses, we constructed a variable for whether the father was ever convicted of a crime after the birth of the child and another for whether the father was ever convicted of a crime before the child was born (we use the latter as a control in multivariate analyses of conviction).[6] As shown in Table 1, 9 percent of the fathers were convicted of at least one crime in the three years following the birth of the child, whereas 19 percent had been convicted of at least one crime before the child was born. These figures suggest a general tapering off of criminal activity among these new fathers, but it must be kept in mind that the time period considered before the birth (ever in the past) is much longer than the three year post-birth observation window.

In the one and three year follow-up surveys, both fathers and mothers were asked if and when the father had ever been incarcerated. We used information provided by the parents to

[6] The following questions were used from the fathers' follow-up surveys to determine if the father had ever been convicted after the birth of the child and whether the father had ever been convicted before the birth of the child: (1) "Have you ever been convicted of any charges?" (2) "How old were you the first when this happened?" (3) "When was your most recent conviction?" For 1,158 fathers, there was inadequate information from which to construct the pre- and post-birth conviction measures (some of these cases would have been dropped anyway, due to missing medical record data or covariates). In 16 of those cases, the father answered the first question but did not provide usable data on age or dates, and in 10 cases the father reported the same age at the time of the last conviction as he was at the time of the birth, making it impossible to determine whether the conviction pre- or post-dated the birth. For most of the 1,158 cases, the father did not complete either of the follow-up interviews. For 320 of the 2,490 cases used in the conviction analyses, we relied on information provided at the one year follow-up interview but did not have three year data (in most cases because the father did not complete the interview at that wave).

construct measures of fathers' post-and pre-birth incarceration (we use the latter in multivariate analyses of incarceration).[7] As shown in Table 1, 12 percent of the fathers were incarcerated at some point after the birth of the child and 15 percent had been incarcerated at some time before the child was born.

Measures of poor infant health

All of the fathers in our sample experienced the birth of a child (not necessarily their first). According to the sociological literature discussed earlier, we would expect that many of the fathers who had engaged in criminal activity in the past would reduce or discontinue their criminal activity after this life event, and that most of those who had not previously engaged in criminal activity would not begin criminal careers. However, for those who have given birth to a child with a serious illness or disability that has long-term consequences, there may be fewer restraints on the father to commit crimes. Framed in the context of economic theory, fathers may gain less utility from ties with both the mother and the newborn if the infant is seriously unhealthy.

We exploit our ability to capture infant health shocks with our data. Unlike most studies that ascertain infant health through survey questions to mothers, we were able to construct measures of poor infant health based on data from hospital medical records (from the birth) as well as maternal reports from the first-year follow-up survey of specific child disabilities, such as cerebral palsy, that were likely present at birth. Our ideal measure of poor infant health has two

[7] The incarceration questions asked of fathers in the follow-up surveys where similar to those for conviction (see footnote 5). The questions asked of mothers about the fathers' incarceration history were similar in structure to those asked of fathers. For 878 fathers, there was inadequate information to allow us to construct the pre- and post-birth incarceration measures (some of these cases would have been dropped anyway, due to missing medical records data or covariates). We used fathers' reports when they were available, but otherwise we used mothers' reports. There were only 18 cases in which the father reported that he had never been incarcerated but the mother gave conflicting information. Fathers' reports were used for 2,355 of the 2,557 cases in the analysis sample for incarceration. Additional details about the construction of the both the incarceration and conviction measures are available upon request.

characteristics: It is unrelated to maternal or paternal behavior, and it associated with long-term morbidity. Thus, it is a true "exogenous shock" as are many congenital conditions. We construct a number of different measures of poor infant health, ranging from a very strict measure that approximates the ideal measure to broader measures, and consider patterns of results across the different measures. The different measures are described and summarized in the Appendix.

The first measure of poor infant health—*very severe infant health condition*—coded from the medical records and one-year maternal reports of child disability, is whether the infant had a major abnormal health condition at birth. The coding of abnormal conditions was conducted by an outside pediatric consultant who was directed to identify cases that were severe, unlikely caused by maternal prenatal behavior, had a poor long term prognosis, and in the case of one-year maternal reports, were likely present at birth. Our goal was to capture conditions that are for the most part random (e.g., Down Syndrome, congenital heart malformations), given that the pregnancy resulted in a live birth. This measure mostly closely matches our two criteria for an exogenous health shock. A disadvantage of this measure is that it is rare: only 2 percent of the children in each of our analysis samples had a very severe infant health condition as we have defined it (Table 1).

The second measure of poor infant health—*severe infant health condition*—is very similar to the first measure (*very severe infant health condition*) but it also includes children who were very low birth weight (<1500 grams) but had no severe abnormal conditions. Very low birth weight is associated with a number of serious and long-term child health conditions (Reichman 2005). Reports of birth weight came from the medical records for over 99 percent of the sample. For the remaining cases, birth weight was ascertained from maternal baseline reports.

Three percent of both analysis samples had a *severe infant health condition* as we have defined it (Table 1).

The third is a direct, but broad, measure of poor infant health—whether the infant had a severe or moderately severe abnormal condition. This measure, which does not take into consideration birth weight, includes conditions that are most likely unrelated to maternal behavior, but may or may not have poor long-term prognoses.[8] We call this measure *any infant health condition.* Again, the coding was conducted by an outside pediatric consultant who systematically reviewed the medical record data on infant conditions, as well as data from the one-year interviews on physical disabilities of the child. One fifth of the children in each of the samples were coded as having *any infant health condition* as we have defined it (Table 1).

The fourth measure of poor infant health is *low birth weight* (< 2500 grams). This measure is readily obtained from maternal reports or medical records,[9] but is not very specific because few moderately low birth weight children (the majority of low birth weight children), those weighing between 1500 and 2500 grams, have severe health problems (Reichman 2005). Another disadvantage is that it may be related, in some cases, to maternal behavior during pregnancy. The advantage of this measure is that it conforms to a widely used standard index and is comparable across studies. Nine percent of the infants in both analysis samples were *low birth weight* (Table 1).

Covariates

As indicated above, we used slightly different analysis samples for each of the dependent variables—post-birth conviction and post-birth incarceration. The characteristics of the two samples are virtually identical (Table 1). We control for a large array of variables that may be

[8] Examples of conditions considered moderately severe are hydrocephaly and cleft palate.
[9] The correlation of birth weights from the two sources in our data is .98.

related to both infant health and the father's criminality, including the child's gender (a dichotomous indicator for male child). Boys are more likely to be in poor health than girls (Verbrugge 1982), and Dahl and Moretti (2004) found that fathers are more likely to remain involved with the mother and child if the child is a boy. If it is true that fathers get more utility from sons than daughters, we would expect the birth of a son to result in less criminal activity than the birth of a daughter.

According to an extensive review of the course of criminal careers, most criminals initiate illegal activity before age 18 (Piquero, Farrington and Blumstein 2003). Thus, past criminal activity is an important predictor of future criminal activity. Additionally, having a prison record may limit legal employment options, thereby increasing the benefits of engaging in crime. In a recent study, Raphael (2006) found that previously incarcerated young men are less likely than those who have not been incarcerated to make successful transitions into adulthood. He also found that previously incarcerated men are more likely to live with their parents as adults, less likely to marry, less likely to be employed, and more likely to have low hourly earnings.[10] Controlling for fathers' pre-birth conviction (in models of conviction) and incarceration (in models of incarceration) allows us to both capture these different starting points and assess changes in criminal activity as a result of the infant health shock.

We include several sociodemographic and human capital-related characteristics of the father (all measured at baseline): age (in five year intervals), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other), nativity (foreign-born, vs. U.S. born), education (high school graduate, any college, and less than high school), current employment, whether he ever

[10] Other studies using the FFCWB data have had similar findings. For example, Geller, Garfinkel and Western (2006) found that men who have been incarcerated earn lower wages and are less likely to be employed than those who have not been incarcerated, and Western (2005) found that men who have been incarcerated are less likely to marry than men who have not been incarcerated.

served in the military, and whether he lived with both of his parents at age 15. As a proxy for household income, as well as for neighborhood conditions, we include the percentage of households in the father's census tract with income under the poverty line.[11] We also include sociodemographic information on the mother, with dichotomous measures for whether she was at least 5 years younger than the father, whether she was a different race/ethnicity than the father, whether she had fewer years of education than the father, and whether she was employed within the 2 year period prior to the child's birth.

Based on the sociological literature linking crime to social ties, the strength of the relationship between the mother and the father may be related to the father's criminality. We include measures of the parents' baseline relationship status—whether they were married, cohabiting, or living apart. Only about one quarter of the parents were married at the time of the birth (by design). Of those who were unmarried, over half were cohabiting. We include several additional proxies for family ties or commitment: whether the mother and father had any other children together at baseline, whether the mother had any children with another partner at the time of the baseline interview, whether the father had at least one child with another partner at the time of the mother's one year follow-up interview,[12] whether the father visited the mother or baby in the hospital after the birth, and whether the parents knew each other for at least 12 months prior to conception of the focal child.

Finally, as indicated earlier, prior research on the determinants of criminal behavior has found effects of criminal justice sanctions, labor markets, and other macro-level variables. In order to control for geographical variations in the probability of arrest, conviction, and

[11] In both analysis samples, 93 percent of the fathers with non-missing data on census tract poverty lived in a tract in which none of the other fathers with non-missing data on this measure resided at baseline.

[12] Data limitations make it impossible to ascertain whether the father had any children with another partner at the time of the baseline.

incarceration, as well as for other city or state characteristics that may affect criminal behavior and possibly infant health, all models include city indicators.

Empirical Model

We are interested in estimating the effects of an infant health shock on the father's subsequent criminal activity. We use probit models to estimate the following equation, which is based on the conceptual model discussed earlier:

Criminal Activity = f (infant health condition; father, mother and, child characteristics; family structure; city indicators; μ)

Estimation of this model is straightforward, assuming that infant health is truly random. It is possible, however, that there are non-random components of infant health (reflected in μ) that are correlated with unobserved determinants of father's criminal activity or that father's criminal behavior affects infant health. We address these issues by: (1) defining poor infant health as an exogenous shock, as determined by an outside pediatric consultant; (2) using longitudinal data, which establishes the temporal ordering of events; (3) controlling for the father's criminal activity prior to the infant health shock; (4) using rich data and including numerous covariates that may be associated with both infant health and the father's criminal activity, including city indicators; (5) assessing the robustness of our results to a number of different model specifications; and (6) exploiting our longitudinal data to test for reverse causality and endogeneity.

Multivariate Results

The results from probit models of the father's criminal activity (any convictions after the birth, ever incarcerated after the birth) are presented in Tables 2 and 3, respectively. In each cell of results, the probit coefficient appears on top; the standard error, which is corrected for city

clustering of observations using the Huber-White method, is in parentheses; and the marginal effect is in brackets.

Father's Conviction/Incarceration

As shown in Table 2, three of the measures of poor infant health (*very severe infant health condition, severe infant health condition,* and *low birth weight*) significantly increase the likelihood the father is convicted of a crime after the birth of the child (by 2 to 8 percentage points), controlling for pre-birth conviction and the covariates. It is noteworthy that the magnitude is greatest for our most stringent measure of poor infant health (*very severe infant health condition*) and lowest for our broadest measure (*any infant health condition*). It is also noteworthy that the marginal effect of *low birth weight* (a less precise measure of poor infant health than the measures of severe conditions and also the most likely of the four measures to be endogenous) is similar in magnitude to that of *any infant health condition* (which is less precise than the measures of severe conditions). Overall, these results indicate that the shock of having a seriously unhealthy child increases the likelihood that the father will be convicted of a crime soon after the baby's birth, and that the more severe the health condition the greater the effect.

The results for incarceration, for which mothers' reports supplemented fathers' reports, are almost identical to those for conviction. As shown in Table 3, poor infant health is significant except when using the broadest (least severe) direct measure (*any infant health condition*). Again, the effect is greatest in magnitude for the most severe measure and lowest for the broadest direct measure (*any infant health condition*) and the most potentially endogenous measure (*low birth weight*). Overall, the results indicate a clear and robust pattern across measures of both infant health and crime that is consistent with our prior expectations.

The effects of the other covariates vary somewhat depending on the measure of criminal activity used, but they paint a remarkably consistent picture. As expected based on the criminal career literature discussed above, the strongest predictor of being convicted (or incarcerated) after the birth of the child is having been convicted (or incarcerated) prior to the child's birth. The father is 15 percentage points more likely to be convicted after the child's birth if he had been convicted prior to the child's birth. He is 17 to 18 percentage points more likely to be incarcerated after the birth if he had been incarcerated before the birth.

Measures of the father's human capital and sociodemographic characteristics are very important predictors of conviction after the child's birth. Fathers who graduated high school or attended at least some college are 2 to 5 percentage points less likely than those who did not graduate high school to be convicted of or incarcerated for a crime after the child's birth. This result is consistent with findings by Lochner and Moretti (2004) of strong effects of high school completion on incarceration while controlling for the potential endogeneity of education. Fathers who were employed at the time of the child's birth are 3 to 4 percentage points less likely than those who were not employed to later be convicted of or incarcerated for a crime. The mother's human capital relative to that of the father is also significant. Fathers are more likely to engage in crime if the mothers are less educated than they are, all else equal.

The likelihood that the father was convicted or incarcerated after the birth is negatively associated with his age, which is consistent with national statistics (see Pastore and Maguire 2003, Table 4.4), as well as literature discussed earlier. Fathers below age 20 are 18 percentage points more likely to be convicted and eight percentage points more likely to be incarcerated in the three years after the baby's birth than fathers aged 40 and above. Consistent with literature discussed earlier, our results suggest that criminal activity of fathers seems to significantly drop

off in the mid-to late-twenties.[13] We find no significant differences between fathers 25-39 and those in their early forties.

Notably, we find no associations between race/ethnicity and crime in our multivariate models. Immigrant status is strongly and negatively related to incarceration. Men who are immigrants are 5 percentage points less likely than native-born fathers to be incarcerated. These results are consistent with those of Butcher and Piehl (1998, 2005), who found that recent immigrants are a select group with lower levels of criminal activity than their non-immigrant peers. We do not find as significant an association between immigrant status and conviction. Living in a poorer census tract at baseline significantly increases the likelihood of future conviction. We do not find significant associations between neighborhood poverty and incarceration.

As expected, fathers who were not married to the child's mother at the time of the child's birth were more likely than those who were married to the child's mother to be convicted of a crime after the birth of the child (4 percentage points). The magnitude of the association of not having been married to the mother is even greater (9 percentage points) for incarceration. The likelihood of conviction does not vary by cohabitation status among parents who were not married at baseline; the same is true for incarceration. Overall, the findings vis-à-vis baseline relationship status are consistent with the life course perspective on crime which posits that strong social ties such as marriage and childbirth reduce criminal activity.

Altogether, the results are strong and robust. Holding constant past criminal activity and numerous covariates, the shock of having an infant in poor health increases the likelihood that the father will become convicted and/or incarcerated. The results are consistent across two

[13] Our pattern of age coefficients may be intensified by the fact that our sample only includes fathers. It is possible that young men who are fathers are more likely than young men who are not fathers to be risk-takers.

different but commonly used definitions of involvement with the criminal justice system and are significant for three different measures of poor infant health that range from exogenous shocks to low birth weight. The pattern across measures of poor infant health is clear and consistent with our prior expectations. The effects are strongest for *very severe abnormal condition*, followed by *severe abnormal condition* and then *any infant health condition.* The results for *low birth weight* are very similar in magnitude to those of the broadest direct measure (*any infant health condition*) and in significance to the measures of severe conditions.

Auxiliary Analyses

1. Addressing potential endogeneity/reverse causality. Our analyses rely on the assumption that our measures of infant health are random shocks. For all measures other than low birth weight, we attempted to define poor infant health as such by using an outside pediatric consultant to select only conditions believed to be unrelated to prenatal behavior. We test whether we have been successful in two ways: (1) by predicting poor infant health as a function of the father's pre-birth criminal activity and the full set of covariates, and (2) by predicting pre-birth criminal behavior as a function of poor infant health and the covariates (if we are truly capturing random health shocks, infant health should not predict pre-birth criminal behavior). In both sets of models, we considered all four measures of poor infant health and did not include post-birth criminal behavior. For (1), we found that for all measures of poor infant health other than low birth weight, the pre-birth measures of criminal behavior did not significantly predict poor infant health. Pre-birth criminal behavior was significantly associated with low birth weight, however, which we assumed from the outset was the potentially endogenous measure of poor infant health of the four. For (2), we found poor infant health was not significantly associated with pre-birth criminal behavior when using all measures of poor infant health other

than low birth weight. Low birth weight did predict pre-birth criminal activity, however, again indicating that low birth weight is endogenous. Together, these results confirm that for the three measures of poor infant health that were carefully constructed by an outside expert to capture random health shocks, we have successfully estimated causal effects on fathers' criminal behavior.

2. Timing of incarceration/conviction relative to arrest. The processing of arrestees through the criminal justice system does not occur immediately. According to the U.S. Department of Justice (2004), the median length of time between arrest and sentencing for those convicted of a felony in a state court in 2002 was 184 days.[14] Thus, for our sample, it is possible that some fathers who were convicted or incarcerated after the child was born had actually committed the crime prior to the birth. To account for this timing issue, we ran supplemental models (corresponding to those in Tables 2 and 3) for which we re-defined post-birth criminal activity as conviction (incarceration) one year or more after the birth of the child, since over three-quarters of felony sentences occur within a year after arrest (U.S. Department of Justice 2004). The marginal effects of poor child health on post-birth criminal activity in these supplemental models were very similar to those presented in Tables 2 and 3 (in fact, they were somewhat larger).

3. Subgroup analyses. We estimated a number of supplemental models to explore whether the effects of poor infant health are stronger for some fathers than others and to assess the extent to which our conviction and incarceration effects represent entry into or continuation of criminal behavior.[15] We estimated probit models for both conviction and incarceration for a number of subgroups of fathers according to marital status, employment status, nativity,

[14] We do not know whether the men in our sample were convicted/incarcerated for a misdemeanor or felony. We would expect the processing time to be shorter for less serious crimes.
[15] The full results from supplementary analyses are not shown, but are available upon request.

education, age, and prior criminality. The marginal effects are presented in Tables 4 (for convictions) and 5 (for incarceration). Estimates are presented from models that use *very severe health condition* or *severe health condition*.[16] Because cell sizes become quite small in many of the subgroup analyses, the results should not be interpreted as conclusive. We present results only for sub-samples with at least 500 observations. Other than variables used as stratifiers, we include all of the individual-level covariates in Tables 2 and 3. Because of small cell sizes, however, we do not include city indicators. Although the city indicators were highly significant in the main models presented in Tables 2 and 3 (result not shown), excluding them does not change the estimated effects of poor infant health on criminal behavior.[17]

Given the previous literature on criminal activity and social ties discussed earlier and evidence that the father's contact with the child (as proxied by living arrangements) depends on his relationship with the mother (Reichman, Corman and Noonan 2004), we would expect unmarried men to be more responsive than married men (in terms of engaging in criminal behavior) to an infant health shock. As expected, the effects of poor infant health on criminal behavior were about twice as large for the non-marital sample than for the full sample, no matter which measure of severe conditions or criminal activity is used.

Fathers who were employed at the time of the birth arguably have a higher opportunity cost of committing crime than fathers who were not employed. Fathers who are not employed may have less to lose by engaging in criminal behavior and therefore might be more sensitive than employed fathers to the shock of having a seriously unhealthy infant. As expected, we find that effects of having an unhealthy child are much smaller for baseline employed fathers than for the full sample.

[16] We do not include the *any infant health condition* measure in the subgroup analyses because we did not find significant main effects for this measure.
[17] This can be seen by comparing the relevant estimates in Tables 4 and 2 and in Table 5 and 3.

As discussed earlier, Butcher and Piehl (1998, 2005) found that immigrants have low rates of criminality, suggesting that they may be less responsive than native-born individuals to adverse shocks in life circumstances. As expected, we find stronger effects of infant health shocks for native-born fathers than for all fathers.

Most (non-white collar) crimes are committed by men with low levels of human capital and limited employment opportunities in the legal sector. Therefore, we would expect relatively uneducated fathers to be more susceptible than all fathers to the shock of poor infant health. Again, the relevant results (for fathers with a high school education or less) in Tables 4 and 5 are consistent with this expectation.

Research on the age profile of criminal careers discussed earlier indicates that by the mid-to late-twenties, men are unlikely to begin a criminal career, and that those who have been criminals are likely to reduce their level of criminal activity or to desist. Therefore, we would expect fathers in their teens and early twenties to be more likely than older fathers to respond to an adverse life event by engaging in criminal activity. We present results for the effects of poor infant health for both younger (less than 25 years) and older (25 years and over) fathers. We find that, for both health measures and both outcomes, younger fathers are at least twice as likely as older fathers to respond to the birth of a infant in poor health by engaging in criminal activity. Notably, even with small sample sizes, the effects of *very severe health condition* for the older cohort are statistically significant.

To explore whether our effects represent entry into or increases in criminal activity versus continuing or not desisting, we examined the effects of infant health shocks on criminal activity among fathers without criminal histories. We find that the effects are somewhat smaller for that sub-sample than for the full sample (Tables 4 and 5), suggesting that lack of desistance

may be more important than entry. It is notable that the differences by criminal history appear to be much less dramatic than those by education (Table 4) and marital status (Tables 4 and 5).

To further explore entry and lack of desistance, we ran models for young (less than 25 years) and older (25 and above) fathers who had not previously engaged in criminal activity. We find that for young fathers with no criminal history, a poor infant health shock increases criminal activity—by between 7 and 30 percentage points, depending on measures used (Tables 4 and 5). The effects exceed those for all young fathers in 3 out of the 4 specifications. In contrast, there are virtually no effects of *very severe infant health conditions* (our most exogenous measure) on crime for older fathers with no criminal histories, while there are significant effects for all older fathers. Taken together, this set of results suggests that infant health shocks (1) increase the likelihood that teen and young adult fathers begin criminal careers, and (2) reduce the likelihood that older fathers with criminal histories desist, but (3) do not increase the likelihood that older fathers without criminal histories enter into criminal activity.

Conclusions

We found that the birth of a child with a severe health problem increases the likelihood that the child's father will engage in criminal activity in the three year period following the birth. The effects are greater for young, unmarried, and uneducated fathers than for their older, married, and educated counterparts. The effects for young fathers appear to largely reflect entry into crime, whereas those for older fathers appear to reflect a reduced likelihood of desistance among those who have committed crime in the past.

This study represents the first investigation in the economics literature of the effects of a traumatic life event on an individual's propensity to commit crime. It contributes to both the crime literature and to the relatively recent and growing body of work on the effects of poor

health at birth on family resources. It also provides some evidence to support a hypothesized relationship between social capital and crime. In particular, we identified an exogenous event that has previously been shown to be associated with lower levels of family and labor market ties, and found that it had a significant effect on young men's criminal behavior—with stronger effects for young men than for older men.

We close with several caveats. First, we studied an urban sample of mostly non-marital births, so the results may not be generalizable to the overall population. Nevertheless, it is a high-risk, policy-relevant sample. Second, our measures of criminal activity are imperfect; it would have been better to have a precise measure of the number, frequency, and intensity of crimes committed. As far as we know, however, there are no available population-based individual level data that are linked to measures of actual crime. Third, incarceration or conviction data were missing for a fairly large number of cases and there are systematic differences between cases with and without missing data. Conviction data are available only for fathers who completed at least one follow-up interview; the incarceration sample is broader because mothers could provide the needed data. The fact that the results for incarceration and conviction are quite similar (using the two different samples) suggests that missing data is not a large problem.

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Table 1: Sample Characteristics

	Sample for Conviction Analysis (N=2490)	Sample for Incarceration Analysis (N=2557)
Father's Criminal Activity		
Convicted After Baseline	.09	
Ever Convicted Before Baseline	.19	
Incarcerated After Baseline		.12
Ever Incarcerated Before Baseline		.15
Child's Characteristics		
Very Severe Infant Health Condition	.02	.02
Severe Infant Health Condition	.03	.03
Any Infant Health Condition	.20	.20
Low Birth Weight	.09	.09
Male	.52	.52
Father's Characteristics		
Age 15-19 Years	.08	.08
Age 20-24	.32	.31
Age 25-29	.24	.25
Age 30-34	.18	.18
Age 35-39	.11	.11
Age 40 or more*	.07	.07
Less Than High School*	.33	.33
High School Graduate	.35	.35
Any College	.32	.32
Employed at Baseline	.81	.81
Non-Hispanic White*	.19	.19
Non-Hispanic Black	.48	.49
Hispanic	.28	.28
Other Race/Ethnicity	.05	.05
Immigrant	.16	.16
U.S.-Born*	.84	.84
Served in the Military	.10	.10
Did Not Complete Baseline Interview	.08	.10
Did Not Complete 1 year Interview	.10	.07
Did Not Complete 3 year Interview	.13	.12
Lived With Both Parents at Age 15	.43	.43
% Below Poverty Census Tract, mean	.18	.18
	(.13)	(.13)
Missing Census Tract	.05	.07
Mother's Characteristics		
At Least 5 Years Younger Than Father	.26	.26
Different Race/Ethnicity Than Father	.14	.14
Less Educated Than Father	.24	.24
Worked in 2 Years Prior to Birth	.81	.80

Continued on next page

Table 1 (cont'd)

	Sample for Conviction Analysis (N=2490)	Sample for Incarceration Analysis (N=2557)
Family Structure		
Married at Baseline*	.27	.27
Cohabiting (not married)	.42	.41
Not Cohabiting	.30	.32
Parents Knew Each Other at Least 12 Months	.86	.86
Parents Have Other Children Together	.32	.32
Mother had Child with Another Partner	.33	.33
Father had Child with Another Partner	.30	.30
Father Visited in Hospital	.90	.89

Notes: Figures are proportions, except for father's age, age difference, and census tract poverty.
*Reference category in regression analyses.

Table 2: Father Convicted After Birth (N=2490)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Child Characteristics				
Very Severe Infant Health Condition	.59**			
	(.26)			
	[.08]			
Severe Infant Health Condition		.35*		
		(.19)		
		[.04]		
Any Infant Health Condition			.15	
			(.12)	
			[.01]	
Low Birth Weight				.22*
				(.12)
				[.02]
Male Child	-.09	-.10	-.09	-.08
	(.08)	(.08)	(.08)	(.08)
	[-.01]	[-.01]	[-.01]	[-.01]
Father's Characteristics				
Ever Convicted Before Birth	1.02***	1.01***	1.01***	1.00***
	(.10)	(.10)	(.11)	(.10)
	[.15]	[.15]	[.15]	[.15]
Age 15 - 19	1.04***	1.05***	1.03***	1.03***
	(.28)	(.30)	(.30)	(.30)
	[.18]	[.18]	[.17]	[.18]
Age 20 - 24	.68***	.69***	.68***	.68***
	(.21)	(.22)	(.22)	(.22)
	[.07]	[.08]	[.07]	[.07]
Age 25 - 29	.22	.24	.23	.23
	(.24)	(.25)	(.25)	(.26)
	[.02]	[.02]	[.02]	[.02]
Age 30 - 34	.06	.07	.05	.07
	(.26)	(.27)	(.27)	(.27)
	[.00]	[.01]	[.00]	[.01]
Age 35 - 39	-.20	-.18	-.20	-.19
	(.32)	(.32)	(.32)	(.33)
	[-.01]	[-.01]	[-.01]	[-.01]
High School Graduate	-.21**	-.20*	-.20*	-.20*
	(.10)	(.11)	(.11)	(.11)
	[-.02]	[-.02]	[-.02]	[-.02]

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Table 2 (cont'd)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Father's Characteristics (cont'd)				
Any College	-.42**	-.42**	-.43**	-.41**
	(.18)	(.18)	(.18)	(.18)
	[-.03]	[-.03]	[-.03]	[-.03]
Employed at Baseline	-.26***	-.27***	-.26***	-.27***
	(.08)	(.08)	(.08)	(.08)
	[-.03]	[-.03]	[-.03]	[-.03]
Non-Hispanic Black	-.11	-.13	-.12	-.13
	(.14)	(.14)	(.15)	(.14)
	[-.01]	[-.01]	[-.01]	[-.01]
Hispanic	-.22	-.23	-.23	-.22
	(.15)	(.15)	(.15)	(.15)
	[-.02]	[-.02]	[-.02]	[-.02]
Other Race/Ethnicity	.20	.21	.20	.20
	(.21)	(.21)	(.20)	(.20)
	[.02]	[.02]	[.02]	[.02]
Immigrant	-.20	-.20	-.21*	-.21*
	(.13)	(.13)	(.13)	(.13)
	[-.02]	[-.02]	[-.02]	[-.02]
Served in the Military	-.10	-.10	-.11	-.10
	(.22)	(.22)	(.23)	(.22)
	[-.01]	[-.01]	[-.01]	[-.01]
Did Not Complete 1 Year Interview	.44***	.44***	.44***	.44***
	(.13)	(.13)	(.14)	(.13)
	[.05]	[.05]	[.05]	[.05]
Did Not Complete 3 Year Interview	-.35**	-.34**	-.34**	-.32**
	(.16)	(.15)	(.15)	(.15)
	[-.02]	[-.02]	[-.02]	[-.02]
Did Not Complete Baseline Interview	-.07	-.07	-.08	-.08
	(.11)	(.11)	(.11)	(.12)
	[-.01]	[-.01]	[-.01]	[-.01]
Lived with Both Parents at Age 15	-.16*	-.15	-.15	-.15
	(.09)	(.09)	(.10)	(.10)
	[-.01]	[-.01]	[-.01]	[-.01]
% Below Poverty Census Tract, mean	.64**	.65**	.64**	.64**
	(.29)	(.29)	(.29)	(.29)
	[.05]	[.06]	[.05]	[.05]

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Table 2 (cont'd)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Missing Census Tract	.11	.10	.11	.11
	(.16)	(.16)	(.16)	(.15)
	[.01]	[.01]	[.01]	[.01]
Mother's Characteristics				
At Least 5 Years Younger Than Father	.10	.10	.10	.11
	(.16)	(.16)	(.16)	(.16)
	[.01]	[.01]	[.01]	[.01]
Different Race/Ethnicity Than Father	.02	.01	.01	.02
	(.12)	(.12)	(.12)	(.12)
	[.00]	[.00]	[.00]	[.00]
Less Educated Than Father	.24**	.25**	.25**	.24**
	(.11)	(.10)	(.11)	(.11)
	[.02]	[.02]	[.02]	[.02]
Worked in 2 Years Prior to Birth	.06	.07	.05	.06
	(.17)	(.17)	(.17)	(.17)
	[.01]	[.01]	[.00]	[.00]
Family Structure				
Cohabiting (not married)	.42***	.41***	.40***	.40***
	(.15)	(.15)	(.15)	(.14)
	[.04]	[.04]	[.04]	[.04]
Not Cohabiting	.45***	.44***	.43***	.43***
	(.15)	(.15)	(.15)	(.14)
	[.04]	[.04]	[.04]	[.04]
Knew Each Other at Least 12 Months	.04	.04	.04	.03
	(.13)	(.13)	(.13)	(.13)
	[.00]	[.00]	[.00]	[.00]
Had Other Children Together	.13	.13	.12	.13
	(.10)	(.10)	(.10)	(.10)
	[.01]	[.01]	[.01]	[.01]
Mother had Child with Another Partner	.15*	.15*	.15*	.14
	(.09)	(.09)	(.09)	(.09)
	[.01]	[.01]	[.01]	[.01]
Father had Child with Another Partner	.09	.10	.10	.10
	(.09)	(.09)	(.09)	(.09)
	[.01]	[.01]	[.01]	[.01]
Father Visited in Hospital	-.03	-.04	-.04	-.05
	(.10)	(.10)	(.10)	(.10)
	[-.00]	[-.00]	[-.00]	[-.00]

***significant at 1% level; **significant at 5% level; *significant at 10% level
Note: All models include city indicators (estimates not shown)

Table 3: Father Incarcerated After Birth (N=2557)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Child Characteristics				
Very Severe Infant Health Condition	.55* (.30) [.08]			
Severe Infant Health Condition		.33* (.17) [.04]		
Any Infant Health Condition			.13 (.11) [.01]	
Low Birth Weight				.15** (.08) [.02]
Male	-.07 (.09) [-.01]	-.08 (.09) [-.01]	-.08 (.10) [-.01]	-.07 (.09) [-.01]
Father's Characteristics				
Ever Incarcerated Before Birth	1.04*** (.10) [.18]	1.04*** (.10) [.18]	1.03*** (.10) [.17]	1.03*** (.10) [.17]
Age 15 – 19	.60** (.28) [.08]	.60** (.27) [.08]	.58** (.28) [.08]	.58** (.27) [.08]
Age 20 – 24	.42* (.24) [.04]	.41* (.24) [.04]	.41* (.24) [.04]	.40* (.23) [.04]
Age 25 – 29	.30 (.22) [.03]	.30 (.21) [.03]	.30 (.21) [.03]	.29 (.20) [.03]
Age 30 – 34	.13 (.17) [.01]	.13 (.16) [.01]	.12 (.16) [.01]	.12 (.15) [.01]
Age 35 – 39	-.20 (.21) [-.02]	-.21 (.21) [-02]	-.22 (.21) [-.02]	-.21 (.20) [-.02]
High School Graduate	-.36*** (.10) [-.03]	-.36*** (.10) [-.03]	-.35*** (.10) [-.03]	-.35*** (.10) [-.03]

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Table 3 (cont'd)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Father's Characteristics (cont'd)				
Any College	-.59***	-.59***	-.59***	-.59***
	(.16)	(.16)	(.16)	(.16)
	[-.05]	[-.05]	[-.05]	[-.05]
Employed at Baseline	-.36***	-.36***	-.36***	-.37***
	(.08)	(.08)	(.08)	(.08)
	[-.04]	[-.04]	[-.04]	[-.04]
Non-Hispanic Black	.10	.09	.10	.09
	(.16)	(.15)	(.15)	(.15)
	[.01]	[.01]	[.01]	[.01]
Hispanic	-.10	-.11	-.10	-.09
	(.17)	(.17)	(.16)	(.17)
	[-.01]	[-.01]	[-.01]	[-.01]
Other Race/Ethnicity	.22	.22	.23	.23
	(.17)	(.16)	(.16)	(.16)
	[.02]	[.02]	[.03]	[.03]
Immigrant	-.73***	-.73***	-.74***	-.74***
	(.14)	(.14)	(.14)	(.13)
	[-.05]	[-.05]	[-.05]	[-.05]
Served in the Military	-.11	-.11	-.12	-.12
	(.16)	(.16)	(.16)	(.15)
	[-.01]	[-.01]	[-.01]	[-.01]
Did Not Complete 1 Year Interview	.66***	.67***	.66***	.68***
	(.15)	(.15)	(.15)	(.15)
	[.10]	[.10]	[.10]	[.10]
Did Not Complete 3 Year Interview	-.22*	-.21*	-.20*	-.19*
	(.12)	(.12)	(.11)	(.11)
	[-.02]	[-.02]	[-.02]	[-.02]
Did Not Complete Baseline Interview	.08	.08	.08	.07
	(.13)	(.13)	(.13)	(.13)
	[.01]	[.01]	[.01]	[.01]
Lived with Both Parents at Age 15	-.18**	-.18**	-.18**	-.17**
	(.08)	(.08)	(.08)	(.09)
	[-.02]	[-.02]	[-.02]	[-.02]
% Below Poverty Census Tract, mean	.14	.15	.14	.15
	(.31)	(.32)	(.32)	(.31)
	[.01]	[.01]	[.01]	[.01]

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Table 3 (cont'd)

	Coefficient (Standard Error) [Marginal Effect]			
	1	**2**	**3**	**4**
Missing Census Tract	-.00	-.01	.00	.01
	(.17)	(.17)	(.17)	(.17)
	[-.00]	[-.00]	[.00]	[.00]
Mother's Characteristics				
At Least 5 Years Younger Than Father	.02	.02	.02	.02
	(.17)	(.17)	(.17)	(.17)
	[.00]	[.00]	[.00]	[.00]
Different Race/Ethnicity Than Father	-.01	-.02	-.03	-.02
	(.12)	(.12)	(.12)	(.12)
	[-.00]	[-.00]	[-.00]	[-.00]
Less Educated Than Father	.36***	.36***	.36***	.35***
	(.11)	(.11)	(.10)	(.11)
	[.04]	[.04]	[.04]	[.04]
Worked in 2 Years Prior to Birth	.03	.03	.02	.02
	(.16)	(.16)	(.16)	(.16)
	[.00]	[.00]	[.00]	[.00]
Family Structure				
Cohabiting (not married)	.81***	.80***	.80***	.80***
	(.16)	(.16)	(.16)	(.16)
	[.09]	[.09]	[.09]	[.09]
Not Cohabiting	.83***	.83***	.82***	.82***
	(.15)	(.15)	(.14)	(.15)
	[.10]	[.10]	[.10]	[.10]
Knew Each Other at Least 12 Months	-.01	-.01	-.01	-.01
	(.08)	(.08)	(.08)	(.08)
	[-.00]	[-.00]	[-.00]	[-.00]
Had Other Children Together	.11*	.11*	.11*	.11*
	(.06)	(.06)	(.06)	(.06)
	[.01]	[.01]	[.01]	[.01]
Mother had Child with Another Partner	.09	.09	.10	.09
	(.08)	(.08)	(.08)	(.09)
	[.01]	[.01]	[.01]	[.01]
Father had Child with Another Partner	.18	.19	.19	.18
	(.12)	(.12)	(.12)	(.12)
	[.02]	[.02]	[.02]	[.02]
Father Visited in Hospital	.00	-.00	-.00	-.01
	(.14)	(.14)	(.14)	(.14)
	[-.00]	[-.00]	[-.00]	[-.00]

***significant at 1% level; **significant at 5% level; *significant at 10% level
Note: All models include city indicators (estimates not shown)

Table 4: Marginal Effects of Poor Child Health on Father's Conviction, for Selected Subgroups of Fathers

	Very Severe Infant Health Condition	Severe Infant Health Condition
Full Sample (N=2490)	.07**	.04*
Unmarried (N=1807)	.13**	.07**
Employed at Birth (N=2021)	-.00	.01
U.S. Born (N=2107)	.10**	.05**
High School Education or Less (N=1728)	.11**	.07**
Age < 25 Years at Birth (N=1000)	.11	.09
Age 25+ Years at Birth (N=1490)	.05**	.02
Never Convicted Before Birth (N=2018)	.06**	.02
Never Convicted and Age <25 (N= 788)	.19*	.07
Never Convicted and Age 25+ (N= 1,230)	.01	.00

***significant at 1% level; **significant at 5% level; *significant at 10% level
Each model includes all relevant covariates in Table 2 but does not include city indicators.

Table 5: Marginal Effects of Poor Child Health on Father's Incarceration, for selected subgroups of fathers

	Very Severe Infant Health Condition	Severe Infant Health Condition
Full Sample (N=2557)	.07*	.04*
Unmarried (N=1854)	.13*	.07*
Employed at Birth (N=2074)	.03	.02*
U.S. Born (N=2158)	.09*	.05*
High School Education or Less (N=1776)	.13*	.08**
Age < 25 Years at Birth (N=1008)	.13	.08
Age 25+ Years at Birth (N=1549)	.05*	.02
Never Incarcerated Before Birth (N=2180)	.04	.01
Never Incarcerated and Age <25 (N= 732)	.30**	.09
Never Incarcerated and Age 25+ (N= 1226)	.01	.00

***significant at 1% level; **significant at 5% level; *significant at 10% level
Each model includes all relevant covariates in Table 3 but does not include city indicators.

Appendix: Coding of Measures of Poor Infant Health

The coding of abnormal conditions for this paper was designed to identify cases that were at least moderately severe, unlikely caused by prenatal behavior, had a poor long term prognosis, and were present at birth. A pediatric consultant was directed to glean information from the medical records (augmented with one-year maternal reports) and to assign all infant conditions a number between 1 and 16 according to the grid below. After giving the consultant the grid and clear instructions, the authors had no further input into how particular conditions were coded. If a child had multiple conditions, each condition was assigned a separate number.

Very Severe Infant Health Condition was coded as a one (yes) if the child had a health condition in cell #1. Examples of conditions in cell #1 are microcephalus, renal agenesis, total blindness, and Down Syndrome.

Severe Infant Health Condition was coded as a one (yes) if the child had a condition in cell #1 or the child was very low birthweight (less than 1500 grams).

Any Infant Health Condition was coded as a one (yes) if the child had a condition in either cell #1 or cell number #2. Examples of conditions in cell #2 are malformed genetalia, hydrocephalus, and cleft palate.

	Severity			
	High	Medium	Low	Unknown
Not Behavior Related	1	2	3	4
Possibly Behavior Related	5	6	7	8
Likely Behavior Related	9	10	11	12
Not Enough Information To Determine if Behavior Related	13	14	15	16